A Highly Stable, Flexible Metal Organic Framework for Selective Sorption Applications

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In the emerging and vast field of Metal-Organic Frameworks (MOFs), particular attention has been given in flexible structures. This behaviour is often induced by a physical or chemical stimulus, including the sorption of gases and/or vapors. [1] This kind of flexible MOFs are promising materials for important applications including gas and vapor separation due to their ability to modify their structure in the presence of specific substances depending on their nature. [2]

In this work, we report the synthesis and characterization of a highly stable, flexible MOF, based on a carboxylate functionalized organic linker. The synthesis afforded good quality single crystals, suitable for structure determination using single crystal X-ray diffraction (Figure 1, left). The material has been extensively characterized using a variety of techniques including powder X-Ray diffraction and SEM/EDS. In addition extended gas and vapor sorption measurements using a state-of-the-art volumetric system, revealed a highly flexible behaviour upon sorption of polar vapors. The observed selective vapor sorption properties are very important towards industrially relevant separations processes.

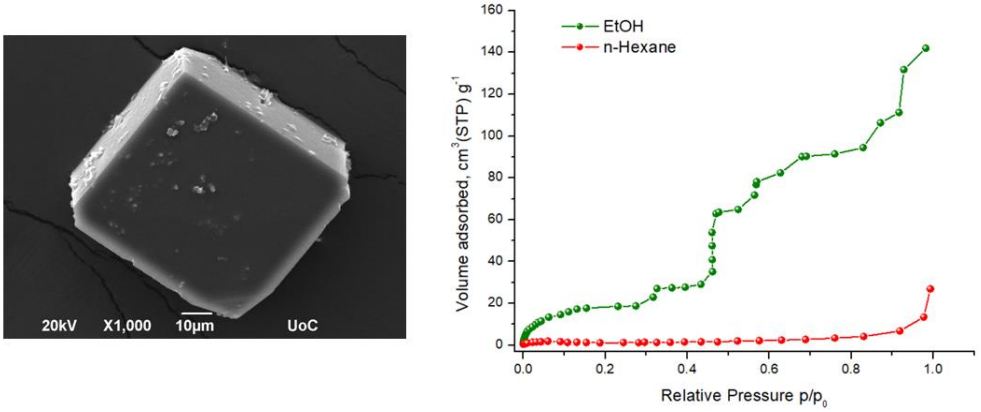

Figure 1: Representative SEM image of the as-synthesized flexible MOF (left). Adsorption isotherms of selected vapors recorded at 298 K up to the corresponding saturation pressure of the adsorbate (right).

References

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